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ABSTRACT

To enlighten the reader on the status of environmental education internationally, this paper discusses current environmental concerns, trends, and problems; reviews environmental-related communications between countries since 1965; and describes environmental education programs in selected countries. Environmental education is interpreted to include the processes of informing people about their environment and developing skills, motivation, and commitment to work toward solving current environmental problems and preventing new ones. The document is presented in five sections. Section I discusses the concept of environmental education and identifies major ecological issues, including ocean contamination, radiation fallout, loss of soil fertility, and malnutrition. Section II summarizes international perspectives on environmental education, stresses the United Nations' influence on program development, and lists educational needs. The needs include improved teacher education, improved research and evaluation, increased funding, and international cooperation. Section III lists and discusses major international conferences which have dealt with environmental education since 1965 and examines communications related to environmental matters between governmental agencies of various countries. Section IV outlines environmental education programs in Africa, Australia, New Zealand, Canada, China, the United Kingdom, the United States, Venezuela, and West Germany. The greatest environmental education need in all countries is coordination of efforts and resources. The concluding chapter suggests that environmental education may be the catalyst that will unite people in all countries in a common effort to find solutions to life threatening problems. (Author/DB)

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INTERNATIONAL ENVIRONMENTAL EDUCATION:

GENERAL PERSPECTIVES, COMMUNICATIONS, AND PROGRAM STATUS IN SELECTED COUNTRIES

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INTERNATIONAL ENVIRONMENTAL EDUCATION: GENERAL PERSPECTIVES, COMMUNICATIONS, AND PROGRAM STATUS IN SELECTED COUNTRIES

I. THE CONCEPT OF ENVIRONMENTAL EDUCATION

In March, 1978, an American owned supertanker of Liberian registration was carelessly run aground on a series of jagged reefs off the western tip of France. Thousands of tons of crude oil spilled into the North Atlantic and quickly spread into the Bay of Biscay and the English Channel killing fish and waterfoul and turning the shoreline into heaps of black gunk. Environmental experts predicted the tourist and fishing industry along an 800 mile stretch of French coast will be destroyed for at least ten years.

Canadian scientists recently confirmed reports that a great number of all dairy cattle in Canada were feeding on grasses which had been contaminated by radioactive dust particles. Consequently, the milk from these cows was found to contain small amounts of radioactivity which could be potentially harmful to infants. The cause of the radioactive dust was found to be fallout from massive clouds of radioactive particles which originated from Russian and Chinese nuclear tests in the upper atmosphere.

The two scenarios described above serve to set the tone for this report. They are true examples of ecological crises which may have broad implications for all citizens of this planet. Other ecological "horror" stories focus on issues such as:

- -the irreversible contamination of the world's oceans due to industrial pollution
- -the overpopulation crises of many undeveloped nations and associated malnutrition of over one fourth of the planet's inhabitants
- -the loss of soil fertility in much of the world due to the pressures of overproduction and natural disasters (draughts, floods, etc.)

-the proliferation of nuclear devices and related danger of political terrorist actions.

Clearly, ecological crises present a growing threat to the inhabitants of "spaceship earth". The concept of environmental education addresses the need to recognize and address global, national, and local ecological problems.

In its broadest sense environmental education (hereafter referred to as EE) can be defined as:

> "the process of recognizing values and clarifying concepts in order to develop skills and attitudes necessary to understand and appreciate the interrelationship between man, his culture and his biophysical surroundings. EE also entails practice in decision-making and self-formulating of code of behavior about issues concerning environmental quality." (1)

However, as EE relates to international education, a better definition proposed by the International Union for the Conservation of Nature, IUCN, might be:

> "Education aimed at developing a world population that is aware of, and concerned about the environment and its associated problems, and which has the knowledge, skills, attitudes, motivations and commitment to work individually and collectively towards a solution of current national and international problems and the prevention of new ones." (2)

Though many other definitions of EE could be cited they all have two important elements in common: the interrelatedness between man and his environment, and the impact of man on his environment.

From a semantic point of view EE is a rather new term. The Educational Resource Information Center (ERIC) has no listing for EE before 1970. The concept of EE, however, is not new. It is a refocusing of existing curricula and educational processes to address the critical ecological problems of today's world. The purpose of this paper is to enlighten the reader as to the status of EE internationally — current organizational trends, content emphases, problems, and communications — and to describe major program efforts in a cross-section of the world's countries.

II. THE INTERNATIONAL EE PERSPECTIVE

The development of the EE concept in the formal sense has been extremely rapid. Informally, EE ideas and themes have been with the world since hominids first learned to stay alive and reproduce in a hostile physical environment. Early environmental learning was survival and safety oriented. Over the centuries environmental information was passed from generation to generation through informal communications. Not until the late 1800's, the 1900's, and more definitely the 1960's and 70's did man take a formal approach to EE. Presently, EE stresses the interrelationships, linkages, and the role of man in managing resources at the local, national, and global level. EE is essentially interdisciplinary and involves the social as well as national sciences. Also, this development has not been linear in nature. It has proceeded from a great number of focal points resulting in an overwhelming diversity of formal program structure. This diversity of program organization and content is particularly evident as one reads Section IV of this report.

Most international EE program thrusts have resulted from United Nations involvement. For example, the UN Conference on the Human Environment (Stockholm, June, 1972) laid the groundwork for establishing the UN Environmental Programme (UNEP) and identified the current status of international EE. A summary of this status report includes the following major points:

1. UNESCO and IUCN (International Union for Conservation of Nature) are the most active organizations in world EE.
2. Most Stockholm Conference participants are developing or have developed EE programs.
3. In most of the world's countires EE is perceived to be more closely related to nature study and environmental studies than to ecological problem solving.
4. Many new EE courses and programs are being developed.

5. Most EE efforts are taking place at the college and university level.
6. EE for citizens and non-educators has just recently received attention. New general public EE programs are emerging rapidly. (3)

A world survey of EE needs and priorities was implemented by UNESCO in 1975 in preparation for the International EE Workshop at Belgrade. The chart below summarizes the results of that assessment.

MAJOR WORLDWIDE AND REGIONAL ENVIRONMENTAL EDUCATION (EE) PROBLEMS, IDENTIFIED BY EDUCATIONAL SECTOR

Educational sector / EE resources by world and region	WORLD	1 AFRICA	2 ARAB STATES	3 ASIA	4 LAT. AMERICA	5 NO. EUROPE	6 WEST EUROPE	7 EAST EUROPE	8 STH. EUROPE	9 NO. AMERICA
	A B C D E F G	A B C D E F G	A B C D E F G	A B C D E F G	A B C D E F G	A B C D E F G	A B C D E F G	A B C D E F G	A B C D E F G	A B C D E F G
1. Pre-school education		• •			• • •	•		• •	• • •	•
2. First level education	• • •	• • • • •	•	•	• • • •	•		• •	• • •	• • •
3. Second level education	• • •	• • • • • •	• •	•	• • • •	•		• •	• • •	• • •
4. Third level education	• • •	• • • • •		•	• • • •	•		• •	• • •	• • •
5. Third level (general students)	•	• • • •		•	• • • •	•		• •	• • •	• • •
6. Third level (teachers)	• •	• • • • • •	• •	•	• • • •	•		• •	• • •	• • •
7. Third level (professionals)		• • • •		•	• • • •	•		• •	• • •	• • •
8. Out-of-school youth education	• • •	• • • • •	• •		• • • •	•		• •	• •	• •
9. Out-of-school adult education	• • •	• • • • •	• •		• • • •			•	• •	• •
10. General educational system	• •	• • • • •	• •		• • •	•		• •	• •	• •

▲ no information available.

Note: Problem identification criteria

"Major" problems are identified as need ratings equal to or greater than 4 (on a 5 point scale), given by the Unesco Member States in the survey questionnaire.

Key for EE resources:

A - Legislation, B - Funds,
C - Instructional arts, D - Physical facilities,
E - Personnel, F - Organizations,
G - Programmes.

The most striking findings of the Belgrade assessment are listed below:

1. Globally, the great majority of countries (63%) have relatively high levels (greater than 3.5 on the questionnaire 5-point scale) of EE needs.
2. Only seven countries show a very low level of general EE needs (about 1.0 on the scale).
3. Almost all (84%) of the countries with a high level (over 3.5 on the scale) of general EE needs are from Africa (31%), Latin America (26%), Asia (15%) and the Arab States (11%).

4. At the world level, the four educational sectors with the highest needs in general EE are, respectively: (1) primary education, (2) secondary education, (3) tertiary education and (4) out-of-school youth education.
5. The great majority of countries (63%) need EE programmes of all types, formal and non-formal, more than any other kind of environmental education resource.
6. At the world level, the dominant EE needs are for (1) funds for innovation, (2) personnel and (3) programmes for in-school and out-of-school activities.
7. At the next lower level of EE needs (considerably below funds, personnel and programmes) are (1) organizations and associations active in EE and (2) instructional materials.
8. The lowest level of needs, none the less important, is for (1) physical facilities and (2) legislation for EE. (4)

Poorer nations such as Latin America and Africa possess more EE problems than the more developed and industrialized nations. In the area of EE curriculum the undeveloped countries of the world seem to have the following problems in common: the trend to define education in accordance with standards from countries at an advanced industrial level; the fact that each subject has an independent programme, not co-ordinated with others, leading to disjointed type of learning; the fact that the natural and social environment are dealt with by two groups of disciplines, giving a distorted and incomplete vision of reality, and making it impossible to approach the environmental problems in a scientific and integrated manner; the theoretical approach to different subject matters, limiting practical exercises included in the curriculum to partial themes or phenomena. The extreme curriculum crowding, present in most formal school systems, is a notable factor which makes the introduction of EE difficult.

Regarding instructional aids and materials, several UNEP meetings have stressed that:

> "design of experimentation with a wide variety of instructional materials should be carried out and that the aids should be

> inexpensive and related to the environment of the learner. It was further emphasized that the materials and aids should be produced locally or nationally in order to satisfy real needs."

The Expert Meeting in Africa stressed that materials should be produced in African languages (5). This is one aspect of the attempt to relate materials and curriculum content more directly to the needs of a region, nation, or local community. It has been stressed that, even within developed countries, there is a great need for local involvement in the production of materials. There may be local sub-cultures that need specially adapted material, minority groups with different life-styles, etc.

Many of the key issues of EE, and even more so of environmental training, are in a state of rapid development. On the one hand it is obvious that universities have responded rather quickly to the need for short, multidisciplinary introductory or overview courses on environmental matters. Various international surveys show this quite clearly. However, an estimate of the number of students who get some kind of EE in this way in the UN member countries indicated that the figure was of the order of 2 per cent (6). This estimate underlines the need for the integration of EE and for a more rapid development in the areas of school education, adult education and the use of mass media as tools in EE. The relatively short overview course is by far the most common type at universities. These courses are usually related to the natural sciences, and in general their main aim is to create an awareness of environmental problems and some understanding of their background.

Teacher training is in many ways central to the development of EE. The Tbilisi Intergovernmental Conference on Environmental Education

recognized this in several recommendations relating both to pre-service and in-service teacher training. The urgency of in-service training may be particularly great. The Conference considered that:

> "the importance of in-service training is underlined by the fact that the great majority of present-day teachers graduated from teacher training colleges at a time when EE was largely neglected, and thus did not receive sufficient education in environmental issues and the methodology of EE ....". (7)

Unfortunately several authors writing on the topic state that relatively little has been accomplished in the development of specific teacher education programs with an environmental focus. In the vital area of teacher and leadership training, colleges and universities play a major role. Yet in the past they have fallen short of the mark. According to one international study, a majority of the colleges of education that responded to a questionnaire are not offering a course in methods of training in environmental science, are not offering a course involving environmental science, are not involved in an environmental science course or curriculum development or in federal, state, county, or local environmental science projects, and are not offering either a major or a minor in EE (8).

The inadequacy of the situation with regard to teacher training has been brought out in several of the documents for the Tbilisi Intergovernmental Conference on Environmental Education. Relatively few efforts have been made in any of the regions to supplement the traditional training of teachers, organizers of educational activities and educational administrators with a view to producing competent staff for EE. Such measures as have been taken generally consist of sporadically introducing environment-related components into traditional discipline-oriented training.

In order to develop teacher education and training, there is an urgent need for "training of the trainers", i.e., the education of personnel in teacher training colleges, etc. This must, in many parts of the world, probably be done on a regional basis. There are such examples in both developed and developing countries, i.e., the Science Education Programme for Africa (SEPA) and the joint courses run by the Nordic Council of Ministers for Education and Culture.

Selim has summed up a number of the needs for teacher training:

1. Teacher training programmes need first of all to instil in the teachers themselves the kind of sensitivity towards the environment that they will be asked to help develop in their students.
2. It is generally agreed that the best kind of teacher training is that which most closely resembles the "real thing", i.e., provides the kind of experience that either takes place in a classroom with children or at least includes similar approaches.
3. EE programmes for teachers should place a strong emphasis on the many kinds of soft and hard materials that are and will be available for classroom instruction - knowledge about what materials currently exist, expertise in how best to locate, select and adapt materials for local programmes, and most importantly, how to use them efficiently in classroom programmes.
4. The adequate training of EE teachers must be accompanied by an awareness of the need to apply their personal commitment and specialized training outside the classroom. (9)

Another reliable source which identifies international EE needs is the annual UNEP status report. The 1978 UNEP report lists 19 major EE needs:

1. specific legislation related to the integration of EE into formal and non-formal educational systems
2. formal organization to implement and coordinate EE programs at the global level
3. long-range research and evaluation of EE programs
4. inservice training for regular education teachers
5. training of trainers in EE
6. integration of EE concepts into existing vocational programs
7. training and retraining of environmental specialists
8. EE adult education
9. increased involvement of higher education
10. integration of EE programs with literacy programs

11. increased use of voluntary organizations within EE
12. development of mass media informational campaigns
13. involvement of national leaders and decision makers
14. relevant curriculum development efforts
15. increased development of teaching materials
16. educational exchanges of EE information
17. increased program funding
18. international cooperation
19. increased program development for developing countries

In reviewing world trends in EE the following general trends are to be noted: in most regions, where formal education is concerned, priority is given at the pre-primary and primary levels, to the natural environment, although several programs exist in each of the regions bearing upon the social environment. In this connection the problems of urban life, as well as matters relating to food, hygiene and health are being tackled almost everywhere as particular problems of the environment.

At secondary school level, the content of EE seems to conform very much to the same pattern, and there is a tendency for it to be incorporated into traditional disciplines, such as biology or geography. Priority is given to the conservation, preservation and protection of natural resources, without much emphasis on the social and cultural aspects of the environment. Nevertheless, numerous examples exist, in all regions, of efforts to include environmental topics involving the social sciences.

In developing countries a number of factors handicapping the formal education systems in relation to development of EE have been identified. These are:

(a) The fact that they are patterned on outmoded systems from developed countries and therefore irrelevant and inappropriate in terms of the socio-cultural and economic realities of the local environment;

(b) That they are inadequate in terms of satisfying the great and urgent demand for education seen as one index of social advance;
(c) The low internal efficiency in terms of high drop-out and repeat rates;
(d) The low external efficiency in terms of the large proportion of school leavers and graduates who are not assured of appropriate employment;
(e) Demographic and financial constraints. (10)

Regarding integration of environmental matters into education, it has already been stated that EE is not a new subject attached to curricula as a separate discipline, but rather a re-orientation of the education process. Integration and re-orientation of entire systems of formal education is of necessity a slow process. Integration has probably gone further at the pre-primary and primary levels of the formal school system. This is a natural result of these levels being less rigidly structured into traditional disciplines. The process of integration is, however, extremely difficult to assess on a world-wide or national basis, since the literature contains hardly any factual material, surveys or quantitative studies of the process.

III. INTERNATIONAL EE COMMUNICATIONS

Within the past decade the concept of "Spaceship Earth" has become highly visible to environmental scientists as well as to political leaders. For example, effects of pollution in one area of the world can easily spread to other areas just as political decisions in one country may have significant impact on another country. National problems, whether they are political or ecological, have a tendency to rapidly transform into world problems. Given this 'spread effect', the need for environmental related communications between countries is evident.

Prior to the 20th century communications between countries regarding environmental issues was very sporadic and dependent upon personal visitations by leading scientists. As international scientific organizations developed in the early and mid 1900's more structured communications occurred. However, these international scientific meetings and conferences rarely, if ever, pursued the topic of EE directly. Not until the 1960's and 70's did environmental communications develop on a noticeable scale. These environmental communications of the 60's and 70's arose from two sources — governmental agencies, and private, non-profit environmental action groups. Since the latter groups are rather content-specific (dealing with matters related directly to the organization's specific purpose), the following discussion of international EE communications will concentrate on governmental agencies' communications.

Three significant international EE communications events have occurred during the past sixteen years. All three of these events have been sponsored by the United Nations for member country participation. A brief description of the major content and findings of these three events follows:

United Nations Conference on the Human Environment — This Conference was held in Stockholm, Sweden, from 5 to 16 June, 1972. The Conference was convened under the following working premise:

> "Man is both creature and moulder of his environment and the power afforded him by scientific and technological advances has given him a new capacity to alter this planet's life-supporting systems in significant and even irreversible ways. That same power, however, carried with it the concomitant responsibility to act with prudent regard for environmental consequences." (11)

From this Conference a total of 26 environmental principles and 7 proclamations evolved. The essence of the proclamations include:

1. Man is a part of, is effected by, and exerts influence on his environment.
2. Environmental quality effects the well being of all people and the economic development of all nations.
3. There is growing evidence of ecological crises in the world.
4. In the developing countries most environmental problems are caused by under-development. Developed countries have the responsibility to assist the under-developed ones.
5. Man is the world's most precious resource.
6. Man must use knowledge to build, in harmony with nature, a better environment.
7. Individuals as well as organizations must accept responsibility to increase the environmental quality.

As a result of this Conference the United Nations Environment Programme (UNEP) was established by the UN in December 1972. The UNEP was charged with the following major responsibilities:

1. Coordinate planning
2. Implement exchange of ideas and information
3. Provide advisory services
4. Provide, promote and coordinate research
5. Support instructional programmes and education of personnel (12)

Along with these responsibilities the UNEP assumed the major role for facilitating international EE communications.

The Belgrade Charter — In October, 1975, a ten-day world conference was held in Belgrade, Yugoslavia. The Belgrade conference evolved from the recommendations of the UN Conference on Human Development and was chaired by William Stapp of the University of Michigan. A primary objective of the Belgrade Workshop was to formulate a broad, coherent set of recommendations to be addressed to appropriate target groups for implementation and action. The procedure chosen by the participants was first to identify and discuss in detail specific problem areas in all aspects of EE. The next step was to develop recommendations as to what must be done—and by whom, that is, the target groups for the recommendations.

Over 150 recommendations were thus brought together in a provisional document. They were edited to eliminate duplications and grouped in the following functional categories:

1. EE at the international level
2. EE at the regional level
3. EE at the national and local level
4. research
5. lifelong EE
6. development of EE programmes
7. mass media and EE
8. training of EE personnel
9. development of EE instructional materials
10. funding
11. evaluation of EE programmes (13)

As a result of the Belgrade conference participating nations developed action plans to implement many of the recommendations. The UNEP assisted countries to plan and implement EE activities.

The Tbilisi Intergovernmental Conference — The UNEP conducted the world's first ministerial level EE Conference in Tbilisi, Georgia, USSR, from 14 to 26 October, 1977. A total of 265 delegates and 65 representatives and observers took part in this global Conference. A formal declaration was developed by the Conference participants which:

> APPEALS to Member States to include in their educational policies measures designed to introduce environmental concerns, activities and contents into their education systems;
> URGES Member States to collaborate in this field, in particular by exchanging experiences, research findings, documentation and materials and by making their training facilities widely available to teachers and specialists from other countries;
> INVITES educational authorities to promote and intensify thinking, research and innovation in regard to EE;
> APPEALS to the international community to give generously of its aid in order to strengthen this collaboration in a field which symbolizes the need for solidarity of all peoples and may be regarded as particularly conducive to the promotion of international understanding and to the cause of peace. (14)

In summary, the Tbilisi Conference's recommendations form the equivalent of an action plan for the development of EE at the national,

regional and international levels. As for Unesco itself, the Director-General pledged to intensify the Organization's work in this programme area in the light of the Conference's recommendations and to move into a more operational phase. This meant making aid from Unesco available to Member States which would like to launch pilot projects; considering a 'bank' of experts on EE; augmenting work in the exchange of experience, in training and in encouraging the production of teaching materials; and strengthening the Secretariat and Unesco's infrastructure in general for the increased promotion of EE, particularly the appointment of specialists in EE to the various Regional Offices and the establishment of training facilities or machinery for cooperation between Member States.

The urgent need for action to protect the environment and perhaps even more for education to this end, was the essential appeal of the Tbilisi Declaration, an appeal, the Director-General had no doubt, "will be heeded."

Other Major Global EE Conferences — The following is a list of major EE conferences and workshops which have been conducted within the past 13 years. Each of these conferences have had significant impact on EE efforts by participating countries.

Conference on Conservation of Nature and Natural Resources in South-East Asia, Bangkok, Thailand, 29 November-4 December, 1965
Workshop on Environmental Education at the University Level, Tours, France, 5-8 April, 1971
European Working Conference on Environmental Conservation Education, Rushlikon, Switzerland, 15-18 December, 1971
International Seminar on Environmental Conservation Education in the School Curriculum in East-European Countries, Kroscienko, Poland, 22-28 June, 1972
International Workshop on Environmental Studies in Higher Education and Teacher Training, London, Ontario, Canada, 5-7 September, 1972

Eastern Africa Youth Meeting on Environmental Conservation, Nairobi, Kenya, 4-16 March, 1974
International Working Meeting on Environment in Education Programmes, Cairo, Egypt, 28 April-2 May, 1974
Pilot Seminar on Environment Education Methodology in East Africa, Mombasa, Kenya, 27 August-4 September, 1974
The African Regional Meeting on Environmental Education, Brazzaville, Congo, 11-16 September, 1976
The Asian Regional Meeting on Environmental Education, Bangkok, Thailand, 15-20 November, 1976
The Arab States Meeting on Environmental Education, Kuwait, 21-25 November, 1976
The Latin American Meeting on Environmental Education, Bogata, Columbia, 24-30 November, 1976
The European Meeting on Environmental Education, Helsinki, Finland, 27-31 January, 1977

All EE conferences listed above were coordinated and conducted by the UNEP. In analyzing the results of each of these EE meetings it could be noted that the conclusions reached varied from region to region, because of the varying environmental situation and state of development. A consensus emerged, however, as to the concept of EE as multi-disciplinary and problem-solving in its approach, life-long in its conduct both inside and outside the formal school system, and encompassing in its view of the environment as a totality—natural and man-made, ecological, economic, social and cultural.

Similarly, the goal of EE was generally agreed upon as aiming at the improvement of all environmental relationships, including the relationship of humanity with nature and people with each other. The modalities alone differed according to the situation, needs and priorities of each region, as they were identified and discussed at each meeting.

A principal constraint, often pointed out by participants, was the rigidity of formal, traditional education which tended towards single-discipline instruction, in contrast and opposition to the inter- and

multi-disciplinary approach of EE. A principal need, it was also affirmed, was coordination and cooperation at the regional and global level to achieve both environmental and EE goals.

IV. EE PROGRAMS IN SELECTED COUNTRIES

Africa - The United Nations Environmental Programme (UNEP) is headquartered in Nairobi, Kenya and is responsible for administering over $35 million in EE project funds worldwide. Projects have been funded in many African nations including Botswana, Ghana, Kenya, Liberia, Senegal, Sudan, Swaziland, and Zaire. (15)

A second major EE influence in Africa is the Science Education Programme for Africa (SEPA). The SEPA grew out of a national effort to develop a primary education science curriculum in 1965 with extensive support from USAID and the Education Development Center of Newton, Massachusetts. Still going strong, the project reaches over eight African nations and has expanded to include primary, secondary, and tertiary education. SEPA emphasizes the development of human resources related to local ecological problems and provides experience-oriented activities for both in-school and out-of-school citizens. (16)

There are of course many conservation and natural resource centered organizations existing in Africa which are under public and private sponsorship. Most of these organizations serve the general public with informational campaigns related to their specific content. For example in Zambia the General Council of Wildlife and the Conservation Society of Zambia sponsor a yearly poster contest in the public schools. (17) Though many such organizations exist throughout Africa they do not present a unified attempt at meeting the current ecological problems and EE needs of the country.

Australia - EE programs in Australia are very diverse and there is no central clearing house for publications and reports. The current thrust, however, is through the development of Environmental Studies Centres scattered throughout urban, suburban and rural areas. These cater for school pupils, university students and interested members of the public and deal with topics such as environmental management, the conservation of natural areas, the improvement of the quality of life in urban areas, pollution control, etc.

The environmental movement in Australia arose largely out of biological studies of the environment and started mainly as a field studies movement not unlike the programs of the network of Field Studies Centres in the United Kingdom. More recently, however, emphasis has been given to environmental impact studies triggered in many cases as a result of confrontations between development (especially mining) and the conservation of natural resources.

Probably the most significant recent development has been the establishment by most State Departments of Education of permanently staffed Environmental Studies Centres based on special purpose schools and managed by staff with special interests and training. Some of these are residential but most are day schools and they present highly varied programs, ranging from rigorous ecological studies to broad overviews of the impact of the environment on the quality of life. (18)

The outdoor education movement has flourished in Australia for many years. Most Australian public school districts offer residential camping programs for students, usually at the sixth grade level and above. The camps offer students the opportunity to explore and learn their immediate environment with much emphasis being placed on the social skills necessary for communal living. (19)

Canada - The development of EE in Canada has been similar to the American EE movement. Public concern for the protection of the environment has led to the development of an overwhelming variety of EE programs in Canadian schools. According to an article by John Passmore "the Canadian EE movement has clearly been a grass roots movement and now enjoys a strong footing in the schools". (20)

Many environmentally concerned groups, public as well as private, have become increasingly involved in the EE movement. For example, the Canadian Conservation Authority has developed many resident outdoor centers for environmental studies throughout Canada. The emphasis of these centers has been one of nature study with a noticeable trend towards a multidisciplinary approach for studying local ecological problems. (21)

As there is no central Ministry of Education for the entire nation, EE as other curriculum areas, is left to the jurisdiction of each individual province and the territories. Within each province the structure also varies. Some provinces have adopted a province-wide manditory curriculum; whereas, others produce various loose guidelines for individual school boards or even schools to interpret and follow as they wish. Hence in one city, EE in one form or another may be reaching one hundred percent of the students. One may travel to a neighboring city and find this topic handled in a very sporadic manner.

At the elementary level EE may involve classroom teachers training about the out-of-doors (both natural and urban) within their own classroom. This could include the growing of plants, keeping of animals, and discussing environmentally oriented current events. The next level of complexity would involve utilizing the school yard in

the form of school gardening or other science and geography programmes. Beyond this, one big field trip is also very common. While travel costs inhibit the programme somewhat, the vast majority of students are out on day trips several times a year. Overnight and residential experiences have recently played a larger role in EE.

At the secondary level, a number of courses entitled Environmental Studies or Environmental Science have been initiated as standard courses which students may choose as part of their course of study. In most areas this is an option. Many provinces also allow high schools to build innovative courses and submit the guidelines to the provincial ministries for approval. Within one province (Ontario) fifty such innovative courses have been approved and, in the last two years, some sixty thousand students have enrolled in environmentally oriented classes. Secondary schools also make use of day-tripping and resident programmes.

At the post secondary level, a wide variety of University courses, usually in the Faculty of Science or Geography, are offered at both the under-graduate and graduate level. They may be a single course taken for general background knowledge or could be a major area of specialization. Many universities are to the point where they have their own faculty of environmental studies. Their students take the majority of their courses but are also allowed to take related fisheries and wildlife or biology courses from other faculties.

Some amount of community EE programs are being conducted by private organizations as well as intergovernmental groups. These non-formal EE efforts are usually directly related to the specific purpose of the group or agency. The three greatest EE needs in Canada appear to be

teacher training, dissemination of useful and accurate EE information, and a clear mandate from the Canadian people to develop EE programs. (22)

China - According to Robert Holloway China is considered to be an environmental model for other nations since the communist takeover in 1949. However, the Chinese have been somewhat forced into their environmental ethic through their critical need for population control. The writings of Mao Tse-Tung from Quotations provide an insight into the socio-political environmental ethic of China:

> "To make China rich and strong needs several decades of intense effort, which will include, among other things, the effort to practice strict economy and combat waste, i.e., the policy of building up our country through diligence and frugality." (February 27, 1957)
>
> "Diligence and frugality should be practiced in running factories and shops and all state-owned, cooperative and other enterprises. This principle of economy is one of the basic principles of socialist economics." (1955)
>
> "Wherever we happen to be, we must treasure our manpower and material resources, and must not take a short view and indulge in wastefulness and extravagance." (January 10, 1945)

Mao's ideology is widespread as a result of the political system, grass roots public campaigns, and emphasis within the educational system. Children and citizens alike learn that the advantages to an environmentally aware way of life are many. Milton describes these advantages as: Ecologically sound; Small energy input; Low pollution rate; Village emphasis; Integration with nature; Technical boundaries set by nature; Labor intensive; Efficiency increases with smallness; Few accidents; Quality criteria highly valuled; and Small units self-sufficient. (23)

In terms of the environment, China has a good overall record. Some of her record has been a matter of circumstances in that the level of development discouraged waste, the population was largely dispersed

over a vast rural area, and the environmental situation was not intolerable when Mao came to power. Also, economic development has not been terribly rapid. Much of her record, however, has been planned as Mao protected the country from many of the abuses of economic development, and he helped the people to become healthy and adequately fed. Finally, her environmental record is proof that the Chinese leaders and people have been able to study, research, plan, and implement environmental concepts. So the record is good in part because it was difficult to do otherwise and in part because of a determination. (24)

The future of China's environmental ethic is in question. The present China signals indicate a stronger push is in store for economic development. This need not result in environmental degradation since the country is equipped to handle the various kinds of problems. The change from the Mao to the Hua ethic could also mean a gradual diminishing of the frugality ethic and the development of a technical approach to environmental matters.

New Zealand - EE in New Zealand is similar in emphasis to EE in England or Australia. Outdoor camping experiences are provided for students every few years. Environmental studies and nature study are the major thrusts of these camping experiences. The New Zealand public schools try to make effective use of their rich surroundings during the camping excursions but do invite the various environmental and conservation authorities into the schools often.

In the colleges of New Zealand all Health and Physical Education Majors are required to complete at least one course involving a residential field experience. Also, all Social Studies Majors are

required to participate in several field oriented environmental studies projects. The geographic structure of New Zealand provides an excellent setting for the study of ecological problems related to a relatively small, isolated ecosystem. However, neither the schools nor the colleges have taken full advantage of this ideal setting for studying man's impact on the environment. Development in New Zealand is causing many ecological problems which have yet to be addressed. (25)

South Asia - (Bangladesh, Afghanistan, Nepal, Pakistan, Iran, and SriLanka) According to a 1975 UNESCO report there are many critical needs for EE in the South Asian countries. Six major constraints to EE include:

1. Lack of relevant EE information for South Asian students.
2. Lack of available EE skills and expertise among educators.
3. Differing frames of reference and interpretations of ecological problems.
4. Lack of a reinforcing social climate for EE programs to develop.
5. Absence of incentives for the development of EE programs.
6. Lack of involvement from private and public organizations at the national and local level. (26)

The UNESCO group saw much impact of Freire's participant-centered, problem solving approach to the literacy problem and recommended that EE content be merged into the literacy campaigns. Other UNESCO recommendations included:

1. Developing EE program incentives
2. Encouraging greater citizen participation in EE efforts
3. An EE campaign designed specifically to reach the rural masses.
4. Funding EE pilot projects
5. Developing regional offices for EE coordination. (27)

The future of EE in the South Asian countries is most likely dependent upon how well EE efforts can be effectively organized and supported, and how well EE can be integrated into the country's developmental efforts. At present severe ecological crises are

occurring with regard to overpopulation, hunger, and pollution. The EE movement in South Asia must confront these problems by promoting ecologically sound approaches to technological and industrial development.

United Kingdom - Within the United Kingdom England provides the directional focus for EE activities. Among all the countries of the world England has the longest history of environmental program development. Organizations such as the Royal Museum and the Historical Society of England have for years championed environmental protection in the United Kingdom.

The EE movement in the United Kingdom is basically one of nature study and environmental studies. Natural science is the content emphasis for most investigations into ecological problems. Almost every human settlement of over 10,000 people, possesses at least one Environmental Study Centre. Each center generally has a specialty area (e.g. - entomology, limnology, lepidoptera) which creates much incentive for environmentally concerned individuals to travel from center to center for new and broader experiences. The Environmental Study Centre concept has been exported to most of the English commonwealth nations, but the focus of centers in nations other than England seems to be more multidisciplinary in nature. (28)

One British authority on EE, Alan Burn, compared British EE to American EE in this manner:

> "In Britain public and private schools make more use of the immediate school grounds and more land is set aside specifically for EE. Students are encouraged and assisted to improve upon their school grounds, build greenhouses, and even develop and manage small farms. There is considerably more teacher preparation for environmental studies and field experiences. There is a greater emphasis in Britain on rural EE programs and secondary EE programs. In England EE is called 'environmental studies', in Canada it is called 'out-of-class studies', and in America it is called EE." (29)

Many British EE programs have been developed for handicapped students and have been used as models for American EE programs. (30) Also, British preschool programs incorporate many learning concepts related to EE which in the United States are not stressed until middle or secondary school. Though environmental problem solving content is not particularly emphasized in British schools the massive amount of nature appreciation and awareness activities have created a populace which is much more aware of ecological problems than in other countries.

Most institutions of higher education in the United Kingdom offer a variety of courses in environmental studies. Virtually all teacher education students participate in at least one residential camping experience before graduating. Most colleges and universities offer undergraduate majors and minors in "Outdoor Pursuits and Environmental Studies." (31)

In 1975 a National Survey of Environmental Knowledge and Attitudes of 5th Graders in England was conducted. The survey reached 15,000 students in 500 schools across England. Results of the survey were as anticipated. Students possessed a positive attitude toward the environment and had a very high understanding of environmental principles and concepts, but overall, students performed poorly on environmental problem solving items. The survey confirmed the fact that nature education at an awareness and knowledge level had existed in English schools for years and that more emphasis was recently being placed on environmental problem solving. Over one-quarter of all schools surveyed had recently (last two years) begun implementing a formal EE problem solving curriculum. (32)

Problems associated with overpopulation and urbanization are increasing rapidly in the United Kingdom. EE planners agree that

Britishers need to drastically change their EE program emphasis to a problem solving approach which develops action-oriented leaders and community planners.

United States - It is indeed difficult to summarize EE in the U.S. due to an incredibly broad and diverse emphasis at every educational level. This is not to say that the people of the United States are all environmentally aware and their environment problem free. More appropriately, the rationale for the diversity of EE emphasis lies in the fact that coordination of EE is poor. There are hundreds of private and public agencies and organizations which administer and support EE programs but the thrust of EE content and process remains unarticulated and fragmented. There are national organizations with regional counterparts, regional organizations, community based groups, local clubs, agencies with indirect environmental emphases at all levels, environmental regulatory agencies, lobbying groups, and advocacy groups — all operating independently of one another to achieve specific EE goals.

Dr. John Kirk of the New Jersey School of Conservation has described the emergence of EE in the U.S. as a "quantum leap" from the nature study and outdoor education emphases of the past. Kirk describes the U.S. nature study emphasis as going through five phases:

1. Awareness Phase - 1860-1890, Thoreau, Muir influence
2. Preservation Phase - 1890-1908, Roosevelt, Pinchot influence
3. Nature Study Phase - 1908,1933, American Nature Study Society influence
4. Education Phase - 1933-1950, Civilian Conservation Corps influence
5. Curriculum Phase - 1950-1960, Conservation Education Association influence

Kirk describes the school camping/outdoor education movement as having three developmental phases:

1. Recreation Phase - 1920-1950, National Camp Directors Association influence
2. Curriculum Phase - 1950-1960, Schools of Conservation influence
3. Conservation Phase - 1960-1970, Silent Spring, Quiet Crisis influence

Finally, Kirk describes the transition to EE in this manner:

> The pressures of the late 1960's, which were felt by the leaders in both outdoor education and conservation, were caused by an increased public awareness of the problem of air pollution, water pollution, noise pollution, landscape pollution, overpopulation, and excess energy demands. It soon became apparent that it was not possible for educators to focus solely on natural resource management and that it was necessary, when speaking about forest lands, woodlands, and open space, to make reference to life in the suburbs and the cities. As the environmental problems increased in significance and number, an educational phenomenon began to take place. These external pressures in our society forced the philosophical components of outdoor education and conservation education on a collision course, and in the late 1960's there was a mixing and a blending which resulted in a great explosion or "quantum jump" which produced a new product, a new philosophy, a new approach: environmental education. (33)

On a national scale the U.S. Office of Education began funding EE programs in 1964 under Title III of the Elementary and Secondary Education Act. In 1970 the Congress approved and funded the Office of EE as a branch of the U.S. Office of Education. Under the direction of the Office of EE the scope of EE programs in the U.S. has broadened from the original outdoor education/recreation focus to human settlements, food production, energy, population, pollution, and many others. Approximately 2.8 million dollars is distributed annually by the Office of EE to schools and agencies in the U.S. (34)

In 1974 a national survey of the environmental knowledge of secondary students was conducted by Walter Bohl of Ohio State University. The survey concluded that high school students have a positive view of the environment and basic environmental concepts but they have little

idea as to how things can be changed to improve the environment or solve environmental problems. (35) Results of this survey are notably similar to the English assessment of 5th graders environmental knowledge described earlier.

A survey of 2,800 colleges and universities conducted during 1974 found that:

1. most schools which reported the development of new EE courses had in most cases refocused existing courses rather than create new ones
2. as the size of an institution increases the number and variety of EE courses increase
3. most small colleges have not implemented EE courses
4. few schools offer EE degree programs

This higher education survey concluded that new EE courses were mainly a result of student and community pressure and stressed problem solving experiences. (36)

In a survey reported by Robert Roth of Ohio State University it was found that all State Departments of Education have a person designated as the State EE Coordinator. The percentage of time a State Coordinator devotes to EE varies from 0 to 100 percent. Most of the State Coordinators have responsibilities other than just EE coordination. (37)

Among all nations the U.S. has assumed a leadership role in the development of EE programs at all educational levels. The focus of most environmental programs in the U.S. is closely related to ecological problems of urbanization, pollution, and energy consumption. Though much environmental literature printed in the U.S. is highly pessimistic about the ecological future of America, it seems that the quantity of environmental awareness and problem solving motivation is also high. For every major ecological problem there is any number of organizations

or individuals working toward the solutions. The greatest EE need then appears to be coordination of efforts and resources.

Venezuela - This South American country has two levels of EE focus — one level deals with public school students and the other with illiterate, rural citizens. On the formal side most elementary schools in Venezuela offer a one week outdoor camping experience for students. Also, there are many day camps operating for visitation and use by all public school students. All colleges in Venezuela offer prospective teachers methods courses in environmental studies and camping experiences.

The Venezuelan Ministers of Agriculture and Education have recently joined forces to coordinate an environmental awareness and problem-solving campaign among the rural citizenry. Programs have been designed to involve poor, village residents throughout Venezuela in educational experiences designed to increase their awareness of local ecological problems and give them the expertise to solve these problems. The scope of this task is overwhelming but Venezuelan officials believe they are causing the quality of the environment to improve in many Venezuelan villages. (38)

West Germany - Up until about 1960 most EE in West German schools was associated with science and geography texts. Under the leadership of the W. German government over 600 field centers for studying the environment have been constructed. The field centers are open to all schools as well as for all citizens to use. Similar to English field centers the W. German centers commonly specialize in a particular ecological content related to the local environment.

An example of a field center is Wegscheide which was built for the Frankfurt schools. Wegscheide is one of the largest resident

environmental facilities in Europe with 16 buildings capable of housing over 1000 people. This field center emphasizes community living, academic classwork related to environmental studies, and problem solving outdoor investigations. (39)

The effects of centuries of heavy agriculture pressure and recent decades of industrialization have left Germany with many ecological problems. Attempts to enlighten the public about the need for environmental quality have been very successful. Though, far from perfect, the citizens and government of West Germany is continuing its campaign to improve the environment through its educational structure. Though this educational effort is primarily associated with the formal science curriculum it is achieving remarkable success in creating environmentally responsible citizens.

V. CONCLUSIONS

Man cannot be considered in isolation from his environment. Over the world, the needs of people still differ enormously. At one time the environmental problems debated in international organizations would predominantly have been those recognized by the developed countries — the need to control pollution and the desirability of conserving samples of the ecological and genetic richness and the natural beauty of the earth. Since the United Nations Conference on the Human Environment, mentioned previously, it has been recognized that environmental issues are also of vital concern to developing countires, and that over much of the world the environmental problems are still those associated with poverty — poor housing, bad public health, malnutrition, and inadequate employment.

These problems can be solved only through development. But that development, producing more food and drawing on the still great resources of the planet, needs to be environmentally wise, and to be based upon thorough evaluation of the potential uses of the different regions of this highly variable earth. Short-term solutions may all too easily lead to long-term losses which a growing world population cannot afford.

There are enough environmental success stories to show that much can be done, in countries with very different political and ideological systems, to improve the quality of life. Probably the only pollutants still increasing in the world are those whose hazards to man or other forms of life have not yet been demonstrated. Science, linked to monitoring, is needed to ensure that new pollutants do not create unrecognized hazards. International schemes to screen such substances before they come into widespread use are a welcome recent development. Science can also guide environmental management by defining potentials for land use under different conditions.

International collaboration, on a scale not seen so far in the history of the world, is essential if mankind is to meet basic human needs and, at the same time, to safeguard the environment for future generations. The recent ratification of a number of important global conventions on matters relating to the environment is an encouraging sign in this respect. Moreover, the increased interest Governments have shown in environmental matters, demonstrated by the establishment of national environmental machinery in many countries, is further evidence of concern for environmentally sound development. This is important because some countries which at present use a disproportionate share of the earth's resources may need to learn to do with less, and

use what they consume less wastefully, as part of this process. There is nevertheless still a danger, at both national and international levels, that Governments will use the inadequacies of present knowledge as an excuse for deferring action that can and must be taken now, but which may demand the adjustment of cherished policies.

Without political will EE can do nothing. The essence of the environmental challenge, therefore, is political rather than technical.

A quote from Dr. John Kirk of the New Jersey School of Conservation provides an appropriate final comment on the importance of international EE:

> "It is interesting to note that EE may prove to be the catalyst that not only saves the human race from extinction, but also may serve to unite all the people of the world in a common effort to find solutions to the perplexing and difficult problems that threaten life on the planet. The seriousness of the environmental problems has forced us all to overlook differences in political ideology in order to protect the life support systems of Spaceship Earth." (40)

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